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CLAIMS

What is claimed is:

- 1 1. A method for calculating a level of detail (LOD) value for use during computer graphics processing, comprising:
- 3 (a) identifying a plurality of geometrically arranged coordinates;
- 4 (b) computing a distance value based on the geometrically arranged coordinates;
 5 and
- 6 (c) calculating a LOD value using the distance value for use during computer
 7 graphics processing.
 - 2. The method as recited in claim 1, and further comprising estimating a derivative value based on the geometrically arranged coordinates, wherein the distance value is computed based on the derivative value.
 - 3. The method as recited in claim 2, wherein the geometrically arranged coordinates include (z_0, z_1, z_2, z_3) which are representative of a quadrilateral with z_0 being an upper left corner of the quadrilateral, z_1 being an upper right corner of the quadrilateral, z_2 being a lower left corner of the quadrilateral, z_3 being a lower right corner of the quadrilateral.
- 1 4. The method as recited in claim 3, wherein the quadrilateral is a 2x2 pixel quadrilateral.
- 1 6. The method as recited in claim 3, wherein the derivative value is a derivative with respect to an x-axis.
- 7. The method as recited in claim 6, wherein the derivative value is calculated using the expression $((z_1 z_0) + (z_3 z_2))/2$.

- 10. 11. 1 DAESTOLS CELOC 2 12. 1 2 1 13. 2 1 14. 2 1 15. 2 3 4
- 1 8. The method as recited in claim 3, wherein the derivative value is a derivative with respect to an y-axis.
- 1 9. The method as recited in claim 8, wherein derivative value is calculated 2 using the expression $((z_2 z_0) + (z_3 z_1))/2$.
 - 10. The method as recited in claim 1, wherein the geometrically arranged coordinates are texture coordinates (u₀, u₁, u₂, u₃).
 - 1 11. The method as recited in claim 1) wherein the geometrically arranged coordinates are texture coordinates (v₀, v₁, v₂, v₃).
 - 1 12. The method as recited in claim 1, wherein the geometrically arranged coordinates are texture coordinates (p₀, p₁, p₂, p₃).
 - 13. The method as recited in claim 2, wherein the LOD value is calculated for dependent textures.
 - 1 14. The method as recited in claim 1, wherein the LOD value is calculated for cube environment mapping.
 - 1 15. The method as recited in claim 1, and further comprising determining if the geometrically arranged coordinates reside on separate sides of a cube map, and performing a coordinate space transform if the geometrically arranged coordinates reside on separate sides of the cube map.
 - 1 16. The method as recited in claim 1, and further comprising determining if a sign of a q-value of a pixel associated with each coordinate is the same.

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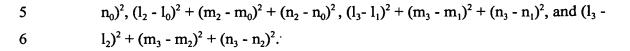
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- 1 17. The method as recited in claim 16, and further comprising setting the LOD
- 2 value to infinity if it is determined that the sign of the q-value of each pixel is
- 3 not the same.
 - 18. The method as recited in claim 1, wherein the geometrically arranged coordinates include (z_0, z_1, z_2, z_3) which are representative of a quadrilateral with z_0 being an upper left corner of the quadrilateral, z_1 being an upper right corner of the quadrilateral, z_2 being a lower left corner of the quadrilateral, z_3 being a lower right corner of the quadrilateral.
 - 19. The method as recited in claim 18, and further comprising transforming the geometrically arranged coordinates to a different coordinate system (l,m,n), wherein the distance value is estimated using an expression selected from the group of $(l_1 l_0)^2 + (m_1 m_0)^2 + (n_1 n_0)^2$, $(l_2 l_0)^2 + (m_2 m_0)^2 + (n_2 n_0)^2$, $(l_3 l_1)^2 + (m_3 m_1)^2 + (n_3 n_1)^2$, and $(l_3 l_2)^2 + (m_3 m_2)^2 + (n_3 n_2)^2$.
- 1 20. A computer program embodied on a computer readable medium for
 2 calculating a level of detail (LOD) value for use during computer graphics
 3 processing, comprising:
- 4 (a) a code segment for identifying a plurality of geometrically arranged coordinates;
- 6 (b) a code segment for computing a distance value based on the geometrically
 7 arranged coordinates; and
- 8 (c) a code segment for calculating a LOD value using the distance value for use during computer graphics processing.
 - 21. The computer program as recited in claim 20, and further comprising a code segment for estimating a derivative value based on the geometrically arranged coordinates, wherein the distance value is computed based on the derivative value.



- The computer program as recited in claim 21, wherein the geometrically arranged coordinates include (z₀, z₁, z₂, z₃) which are representative of a quadrilateral with z₀ being an upper left corner of the quadrilateral, z₁ being an upper right corner of the quadrilateral, z₂ being a lower left corner of the quadrilateral, z₃ being a lower right corner of the quadrilateral.
- 1 23. The computer program as recited in claim 22, wherein the quadrilateral is a 2x2 pixel quadrilateral.
- 1 24. The computer program as recited in claim 22, wherein the derivative value is 2 a derivative with respect to an x-axis.
- 1 25. The computer program as recited in claim 24, wherein the derivative value is calculated using the expression $((z_1.z_0) + (z_3.z_2))/2$.
- 1 26. The computer program as recited in claim 22, wherein the derivative value is 2 a derivative with respect to an y-axis.
- 1 27. The computer program as recited in claim 26, wherein derivative value is calculated using the expression $((z_2, z_0) + (z_3, z_1))/2$.
 - 28. The computer program as recited in claim 20, wherein the geometrically arranged coordinates are texture coordinates (u₀, u₁, u₂, u₃).
- The computer program as recited in claim 20, wherein the geometrically arranged coordinates are texture coordinates (v₀, v₁, v₂, v₃).
- The computer program as recited in claim 20, wherein the geometrically arranged coordinates are texture coordinates (p₀, p₁, p₂, p₃).





- 1 38. A system for calculating a level of detail (LOD) value for use during computer graphics processing, comprising:
- 3 (a) logic for identifying a plurality of geometrically arranged coordinates;
- 4 (b) logic for computing a distance value based on the geometrically arranged coordinates; and
- 6 (c) logic for calculating a LOD value using the distance value for use during computer graphics processing.